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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/038,125	01/02/2002	Geon Choe	SJO920010040US1	7458

7590

03/22/2004

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EXAMINER

OMETZ, DAVID LOUIS

ART UNIT	PAPER NUMBER
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2653

10

DATE MAILED: 03/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/038,125

Applicant(s)

CHOE, GEON

Examiner

David L. Ometz

Art Unit

2653

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 December 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-14 and 39 is/are rejected.
- 7) ☒ Claim(s) 2 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

Art Unit: 2653

1. Applicant's amendment dated 12/29/03 is acknowledged. It is noted that new claim 15 has been renumbered as claim 39 according to rule 1.126 since claims 15-38 had been previously cancelled.

2. Applicant is advised that should claim 4 be found allowable, claim 39 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 3-14, 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 10-256621 in view of Journal of Applied Physics article "Oxygen as a surfactant in the Growth of Giant Magnetoresistive Spin Valves" to Egelhoff et al (hereinafter "Egelhoff"). JP '621 shows a method for providing precise control of magnetic coupling field in NiMn top spin valve head (see col. 2, line 37 for permissible antiferromagnetic materials, specifically "NiMn"), comprising: forming at least one copper layer (3 or 5) in a NiMn top spin valve; and depositing remaining layers (free layer 4, pinned layer 6, and antiferromagnetic layer 7) of the NiMn top spin valve head. However, JP'621 does not show the copper seed 3 and the copper spacer layer 5 being partly oxidized with oxygen. Egelhoff disclosed a spin valve head that oxidizes the copper spacer layer to greatly enhance the magnetoresistive effect (see pages 6144-6147). Therefore, it

Art Unit: 2653

would have been obvious to one of ordinary skill in the art at the time the invention was made to oxidize the copper layers in the spin valve of JP'621 as taught by Egelhoff as doing this would enhance the GMR effect over that of a non-oxidized spin valve head, and would increase the beneficial specular reflection of electrons by creating a smoother or more well ordered growth pattern of the layers as taught by Egelhoff. It is noted that with regard to the dependent claims 3, 4, 6, 7, 12, 13, and 39 the various gains in the spin valve performance (e.g. claim 3-- reduces the ferromagnetic coupling field without deteriorating GMR effect or resistance; claim 4-- provides a negative coupling field without affecting GMR effect or resistance;; claim 7-- provides stronger growth of NiFe(111) and NiMn(111) with respect to NiFe(200) and NiMn(002) phases; claim 12--provides an approximately 15% increase in amplitude of the output of a NiMn spin valve head at the same coupling field; claim 13-- does not affect asymmetry performance; claim 39-- provides a negative coupling field) would all be inherent in oxidizing the copper layers in the JP'621 reference as the structure is the same as Applicant's NiMn top spin valve.

5. Claim 2 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. Applicant's arguments filed 12/29/03 (and attached to paper number 9) have been fully considered but they are not persuasive. Applicant asserts that Egelhoff fails to teach "forming at least one copper layer in a NiMn top spin valve and oxidizing the at least one copper layer" while then forming remaining layers of the NiMn top spin valve head after oxidizing the copper layer. The examiner maintains that Egelhoff discloses the unexpected benefits of forming spin

Art Unit: 2653

valve heads in the presence of oxygen as noted in the above rejection, to which the copper layer(s) are inherently exposed to oxygen (due to the entire spin valve head being formed in the presence of oxygen (see Egelhoff, page 6145, last paragraph). Therefore, one of ordinary skill in the art would have been led by the teachings of Egelhoff to expose the entire spin valve head of Takuji to oxygen during formation. This process would inherently lead to the oxidizing of the copper layers of Takuji. As the instant claims do not preclude the formation of the remaining layers in oxygen, it is maintained by the examiner that the combination of Takuji and Egelhoff is proper (as both involve the formation of spin valve heads) with the motivation to combine being the unexpected gains in spin valve performance experienced by the spin valve heads of Egelhoff.

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

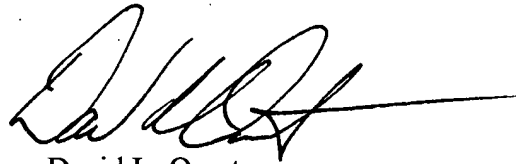
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David L. Ometz whose telephone number is (703) 308-1296. The examiner can normally be reached on M-W, 6:00-4:00.

Art Unit: 2653

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Korzuch can be reached on (703) 305-6137. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4750.

A handwritten signature in black ink, appearing to read 'D. Ometz', with a long horizontal line extending to the right.

David L. Ometz
Primary Examiner
Art Unit 2653

DLO
3/22/04